

ART. II.—*Contributions to Aural Surgery.—Analysis of One Hundred and Forty Cases of Diseases of the Ear.* By EDWARD H. CLARKE, M. D., Boston, Mass.

M. ITARD, in the preface to his treatise upon diseases of the ear and audition, written thirty years ago, stated that a careful exposition and rational therapeutics of diseases of the ear were then to be written. At the close of the same paragraph, he says: "Certain vague or antiquated ideas with regard to the relaxation and tension of the membrane of the tympanum, to pretended abscesses of the ear, paralysis of the acoustic nerve, and the occlusion of the Eustachian tube, form nearly the whole theory of deafness; just as the vulgar application of blisters, the instillation of sundry insignificant liquids into the external ear, and the empirical perforation of the membrane of the tympanum, compose the entire therapeutics of these diseases."* Martell Frank, writing twenty-five years later than Itard, commences his late work upon the *Diagnosis and Treatment of Diseases of the Ear* with very similar language. "There is scarcely a specialty," he says, "of exact medical science and art upon which the attention of physicians has hitherto been less bestowed than upon diseases of the ear."† The reproaches of Itard, more than a quarter of a century ago, and of Frank, at the present day, are unfortunately too true. Of late years, however, there has been much improvement with regard to the study of aural diseases; and, consequently, with regard to their treatment. They are no longer neglected by the profession, and taken up solely by empirics. There are many careful observers, particularly in England and on the continent of Europe, who are directing their attention to the ear and its diseases; and through their labours we may hope that hereafter aural surgery will rest, or rather be built up, upon what can form the only true basis of any science, that of well-observed and carefully recorded phenomena.

It is with the hope of contributing something towards a more accurate knowledge of the diseases of the ear in this country, that the record of the following cases is offered to the attention of those who are interested in this limited, but not unimportant, branch of surgery.

The examination of all the cases which are presented in this paper was made, almost without exception, in a clear sunlight, assisted by Menière's speculum auris, and, when necessary, by the use of the Eustachian catheter and the auriscope. The latter instrument, or, as it is sometimes called, the otoscope, is of great assistance in examinations of the ear, and especially in examinations of the Eustachian tube and the cavity of the tympanum. It

* *Traité des Maladies de l'Oreille et de l'Audition*, par J. M. G. Itard, Paris, 1822, p. v.

† *Practische Anleitung zur Erkenntniß und Behandlung der Ohrenkrankheiten*, von Dr. Martell Frank, 1845, Vorrede.

frequently obviates the necessity of catheterizing the Eustachian passages, and thus facilitates an examination, both for the physician and patient. The records were made either at the time of the examination, or immediately after, and no cases are included which were not carefully recorded. No attempt has been made at a selection of cases. They are recorded as they were presented for treatment. Quite a number which might have been included in the analysis are not, on account of some imperfection in the record. Probably an equal proportion, however, of each class of diseases of the ear has been omitted. Those which are included, therefore, may be considered as representing, with a tolerable approximation to accuracy, the varieties of aural disease as they occur in New England, and the proportion of each class to the others.

The classification which I have adopted is that proposed by Kramer, and sanctioned by Menière. It is, perhaps, the most convenient for practical use of any that has been proposed; though liable to the charge of not being really scientific. According to this classification, diseases of the ear are divided into those of the external ear, of the *membrana tympani*, of the middle ear, and of the internal ear. The diseases of these different classes are so apt to run into each other, that it is not always an easy matter to separate them accurately in practice, and to assign to each one its proper position. This is particularly true of the first three classes; and the difficulty is increased by the fact that, in a great majority of instances, no application is made for relief until the disease has made considerable progress, and extended beyond its original seat. A careful inquiry into the history of the case, together with an accurate examination of the diseased parts, will, in most cases, however, enable the practitioner to distinguish with sufficient accuracy affections of one class from those of another. Otorrhœas, following the exanthemata, in which not only the *membrana tympani* is diseased, but frequently also the dermal tissue of the meatus and the cavity of the tympanum, are classified under the head of diseases of the *membrana tympani*. When the discharge has proceeded from the meatus, without involving the fibrous coat of the membrane of the tympanum, even if the external coat of this membrane were implicated, the disease has been classed with affections of the external ear. In this way I have endeavoured to trace every discharge to its seat, and classify it accordingly. To make a distinct class of diseases, called otorrhœas, would be to substitute a symptom for its cause. In like manner, polypous and fungoid growths are classed according to their seat, as an attendant of some other affection, and not separated into a distinct class.

One of the most practical questions with regard to diseases of the ear concerns their curability. Many persons, both within the profession and out of it, are incredulous as to the advantage of treating aural diseases. The following are the results, bearing upon this point, obtained from 140 cases:—

Table of the Curability of Diseases of the Ear.

Name of the disease.	Relieved.	Improved.	Not improved.	Not treated.	Total.
EXTERNAL EAR.					
Acute inflammation of the dermal tissue of the meatus	4				4
Chronic inflammation of the dermal tissue of the meatus	3	1			4
Acute inflammation of the cellular tissue of the meatus	5				5
Acute inflammation of the glandular tissue of the meatus	1				1
Chronic inflammation of the glandular tissue of the meatus	1				1
Eczema of the meatus	1				1
Accumulation of wax	16				16
MEMBRANA TYMPANI.					
Acute myringitis	7				7
Chronic myringitis, not succeeding scarlatina	5	6	3	6	20
Chronic myringitis, succeeding scarlatina	5	12		5	22
MIDDLE EAR.					
Acute catarrh of the middle ear	6				6
Chronic catarrh of the middle ear	5	4			9
Acute inflammation of the deep-seated tissues of the middle ear	2	1			3
Chronic catarrh and obstruction of the Eustachian tube		0	1		1
INTERNAL EAR.					
Nervous deafness		7	10	17	34
Probable congenital deafness				4	4
Symptomatic deafness	1			1	2
Total	62	31	14	33	140

Omitting the different varieties of each class, this table presents the following result:—

	Total No.	Relieved.	Improved.	Not improved.	Not treated.
Affections of the external ear	32	31	1	0	0
Affections of the membrana tympani	49	17	18	3	11
Affections of the middle ear	19	13	5	1	
Affections of the internal ear	40	1	7	10	22
Total	140	62	31	14	33

From this it appears that nearly all the diseases of the external ear, or more than 0.9, were relieved. Such favourable results were not obtained in diseases of the membrana tympani. Out of 49 cases of disease of this membrane, only 17, or about 0.35, were relieved; 18, or 0.37, were improved; and 14, or 0.28, were incurable. Diseases of the middle ear proved to be more amenable to treatment. Out of 19 cases, 13, or about 0.68, were re-

lieved; 5, or 0.26, were improved; and 1, or 0.05, were incurable. Diseases of the internal ear were the most intractable of all. Only 1 out of 40 cases, or not quite 0.03, were relieved; 7, or nearly 0.2, were improved; and 32, or 0.8, were incurable. The aggregate result is this: 62 from 140 cases of disease of the ear, or 0.44, were relieved; 31, or 0.22, were improved; and 47, or 0.33, were found to be incurable. In other words, about two-thirds of these cases were improved or relieved by treatment, and the remaining third were incurable. This result, though not so favourable as might be wished, is by no means a discouraging one. It shows that something may be done for the relief of these complaints; and, doubtless, more would be accomplished, if greater attention were bestowed upon them. Almost all the above cases of disease of the external ear proved to be susceptible of relief; next came those of the middle ear; then those of the *membrana tympani*; while scarcely two-tenths of those of the internal ear (nervous deafness) were even improved.

So far as the external ear, the *membrana tympani*, and the middle ear are concerned, this result agrees very nearly with the statistics of Kramer. It does not accord so well, however, with the results he obtained in treating diseases of the internal ear. According to his statement, out of 2000 cases, 1568, or about 0.8 (rather more than two-thirds) were either improved or relieved; while 382, or less than 0.1, were incurable.* In affections of the external ear, 276 out of 286, or 0.9, were relieved; 6 were improved; and 4 were incurable. In diseases of the *membrana tympani*, 72 out of 442, or nearly 0.2, were relieved; 325, or 0.7, were improved; and only 45, or 0.1, were found to be incurable. That is, nine-tenths were either relieved or improved, and only one-tenth were incurable. From my own statistics, it appears that not quite eight-tenths were relieved and improved, and rather more than two-tenths were incurable. Again, with regard to the middle ear, M. Kramer obtained a cure in 166 cases out of 198, or a proportion of more than 0.8; 16, or 0.08, were improved; and the same number were incurable. This agrees very nearly with the proportions obtained from my own much more limited number of cases. With regard to the internal ear, there is considerable disparity. Out of 1074 cases of nervous deafness, treated by M. Kramer, 54, or 0.05, were relieved; 703, or nearly 0.7 were improved; and 317, or only about 0.4 were incurable. Of the 40 cases of nervous deafness reported above, 32, or eight-tenths are given as incurable. It should be stated, however, in this connection, that I declined to treat 22 of the 40 cases at all; and but very few of the remaining 18 were treated for the length of time (three months or more) which Kramer considers necessary in order to produce any beneficial change in affections of the acoustic nerve.

One reason why diseases of the ear are so often treated unsuccessfully is the length of time which patients allow to elapse after the disease has com-

* *Traité des Maladies de l'Oreille*, par Guill. Kramer, traduit de l'Allemand par P. Menière, p. 66.

menced before it is submitted to treatment. There appears to be a great unwillingness in the community to have their ears "meddled with," as the phrase is. In many cases, weeks, and months, and years are allowed to pass by, after the hearing is affected, before any attempt is made to obtain relief. In consequence of this delay, organic changes often occur, which are irremediable, and which might have been prevented. Moreover, diseases of the ear, even affections of the meatus as well as of the membrana tympani and middle ear, and particularly those of the internal ear, are out of sight; they are not obvious, like many affections of the eye. The attention of the patient is not drawn to the ear, as being really the seat of any trouble, because he cannot see any redness or other disturbance. He may be sensible of occasional irritation, or pain, with or without tinnitus, and accompanied with more or less deafness. All this is regarded as a temporary matter, which will soon pass away; and thus the disease is allowed to go insidiously on, unchecked. If the various forms of inflammation, which attack the external auditory meatus and the membrana tympani, were as visible and as easily recognized as those which occur in the eye, the former would doubtless be as promptly attended to as the latter. The following table exhibits a striking confirmation of the above remark:—

Table of the Time elapsed before Application for Relief.

	External ear.	Membrana tympani	Middle ear.	Internal ear.	Total.
Two weeks and less	4	5	4		13
Three to four weeks	7	3	3		13
One to twelve months	3	8	3	4	18
One to five years	2	11	4	15	32
Above five years		22	5	21	48
Unknown (accumulation of wax)					16
Total					140

From this it appears that only 13 (out of 140 individuals whose ears were diseased) applied for relief within two weeks from the supposed commencement of the attack, while 80 suffered more than a year to elapse, and 48 more than five years to elapse, before seeking medical aid. I cannot doubt that many of these cases might have been relieved if they had been treated early. A prompt attention to any disturbance in the ear is particularly important in inflammations of the membrana tympani. Acute myringitis is generally amenable to treatment, while chronic myringitis, whether resulting in thickening or in perforation of the membrane of the tympanum, is one of the most irremediable forms of aural disease.

The etiology of diseases of the ear is exceedingly obscure. Individuals, whose audition is in any way impaired, are not usually seen by competent observers until the disease is fully established. And even when the cause is well ascertained, as in otorrhœa and the like following scarlatina or the other

exanthemata, we know very little of the *modus operandi* of the cause; we do not know what the destructive processes are to which the tissues of the ear have been subjected. Thus far I have met with but very little that is satisfactory on this point. The following tables embody the few results at which I have arrived:—

Influence of Sex and Age on Diseases of the Ear.

	Male.	Female.	Under 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.
External ear	20	12	5	9	10	3	4	1
Membrana tympani	23	26	19	10	9	5	4	2
Middle ear	8	11	1	9	7	2		
Internal ear	23	17	3	4	11	12	3	7
Total	74	66	28	32	37	22	11	10

Difference of sex does not appear to exert any great influence upon diseases of the ear. There were eight more males than females, according to the above tables, whose ears were more or less affected, out of 140 cases. It is very possible that even this difference was accidental. At any rate, it is not marked enough to warrant the conclusion that the male sex are more liable than the female to these diseases. This is not the case, however, with regard to age. Infancy and childhood are especially liable to certain classes of disease; manhood and age to other varieties. Thus it appears that 14 out of 32 cases of disease of the external ear, or nearly one-half, occurred under the age of 20; and 5 of these under the age of 10. More than one-half of the affections of the membrana tympani, or 29 out of 49 cases, occurred under 20; and 19, or very nearly one-half, under 10. Again, with regard to the middle ear, 9 out of 19 occurred between the ages of 10 and 20. When we come to the internal ear, the case is reversed. Only 7 out of 40 cases of nervous deafness occurred under 20; and of these 7, 3 were probably congenital; while 22, or more than one-half of the individuals affected, were above 30 years of age, and 10 were above 40. The largest number of diseases of the external ear occurred in individuals between 10 and 20; of the membrana tympani, in those under 10; of the middle ear, in those between 10 and 20; and of the internal ear, in those from 30 to 40. The general result of these figures goes to show that infancy and childhood are peculiarly exposed to affections of the external auditory meatus and of the membrana tympani; individuals from 10 to 30 to affections of the middle ear, including, of course, the Eustachian tube, and often implicating the fauces; and that after 30 the internal ear is most frequently affected.

The following table presents a view of various other circumstances that appeared to have exerted a marked influence in causing the diseases recorded above:—

Causes of Diseases of the Ear.

Diseases of the	Succeeding								Un- known.
	Cold.	Scarla- tina.	Measles.	Typhoid fever.	Acci- dent.	Epilep- sy.	Here- ditary.	Syphi- lis.	
External ear	13	1	4						14
Membrana tympani	9	22		1	3		2	1	11
Middle ear	11		1	4	1	1	17		8
Internal ear									16
Total	33	23	5	5	4	1	19	1	49

It will be seen from this, that cold holds the most prominent place as a cause of disturbance in the ear. 33 out of 140, or 0.23 per cent. of all the above cases, followed exposure to cold. This confirms the remark of M. Kramer, that "cold, in whatever form it reaches the ear, acts in a most injurious manner upon the acoustic nerves, and upon all the constituent parts of the auditory apparatus."* The exanthemata stand next in frequency to cold as a cause of disease. In the cases which have been presented to my observation, scarlatina has been much more frequently followed by otorrhœa or some other affection, than measles. Whether a more extended observation would confirm this remark is perhaps doubtful. Of the 23 cases of aural disease which followed scarlatina, 22 are recorded under the head of disease of the membrana tympani. It is possible that, in some of these instances, the affection had its origin either in the middle ear or in the external meatus; but, as in all of them, the membrane of the tympanum was the part most seriously disorganized, they are classed under that head. Hereditary predisposition does not appear to be a very efficient cause, except in affections of the internal ear. In 17 out of 40 cases of nervous deafness, or nearly one-half, the disease seemed to be in a greater or less degree inherited. So far as these cases go, it is fair to infer that hereditary predisposition exerts a powerful influence in producing the most incurable kind of deafness, viz., that resulting from some disease of the acoustic nerve; and but very little influence in producing any other. Next to hereditary predisposition, typhoid fever is recorded as the most active agent in causing nervous deafness; or, perhaps, I should say, the most frequent antecedent to this affection. Only 4 cases, however, or not quite 0.1, were thus originated. For a large number of cases no cause could be ascertained, though careful inquiries were always instituted. We should not infer from this that in all these instances the disease originated spontaneously. Owing to forgetfulness, or lack of intelligence, or of observation on the part of the patients or their attendants, it was often impossible to ascertain the circumstances under which the affection arose. In no other organ of special sense is the commencement of disease more liable to be over-

* Op. cit., p. 27.

looked than in the ear. It appears, then, from these observations, that the following circumstances may be considered as influential causes of aural disease, viz., cold, the exanthemata, hereditary predisposition, and typhoid fever.

The duration of treatment varies considerably for the different varieties of disease. Thus, of 32 cases of disease of the external ear, 16 were accumulations of wax, and were relieved at once. Of the remaining 16, 3 were relieved after a treatment of from one to two weeks; 7 after a treatment of from two to three weeks; 4 were treated from one to two months; and the remaining 2 from two to three months. Diseases of the membrana tympani were not so readily relieved. Of 49 cases, 11 were not treated. Of the remaining 38, only 7 were treated less than a month, and these were cases of acute myringitis; 26 were treated for a period of from one to six months; and 5 from six to twelve months. It should be recollected, however, that a large proportion of these were cases of otorrhœa, whose inveteracy is well known to all who are at all acquainted with aural diseases. Of 19 cases of disease of the middle ear, of which 18 were either relieved or improved, 5 were treated from one to four weeks; 13 from one to four months; and 1 from eleven to twelve months. 40 cases are given above of diseases of the internal ear. Of these, 22 were not treated. Of the remainder, 3 were treated for less than a month only; 7, from one to two months; and 7 from two to five months. It appears from this, that affections of the external auditory meatus are relieved after a comparatively short treatment. Those of the membrana tympani, when acute in their character, are equally amenable to treatment; but, when chronic, are among the most inveterate of aural diseases. Those of the middle ear are frequently chronic in their character, and often require considerable patience, both from the practitioner and patient, in order to arrive at a satisfactory result. Lastly, affections of the internal ear, unless they are merely symptomatic of some more general affection, and, therefore, relieved when that affection is relieved, are either incurable, or, according to Kramer, require a treatment which shall continue, not for weeks, but for several months.

There are several other points of interest which we have not space to dwell upon, but which are presented by the following table. They are the condition of the ceruminous secretion in the various affections mentioned above, the absence or presence of otorrhœa, perforations of the membrana tympani, polypous and fungoid growths, complications, and the like.

Names of the disease.	Wax absent.	Deficient.	Normal.																
EXTERNAL EAR.																			
Inflammation of dermal tissue of meatus; acute, chronic, and exudative.	3	4	2																
Inflammation of cellular tissue of meatus; acute.	3	2																	
Inflammation of glandular tissue; acute and chronic.	2																		
Accumulations of wax . . .																			
MEMBRANA TYMPANI.																			
Meningitis; acute . . .	1	3	2	1	1														
Meningitis; chronic . . .	8	10	2																
Meningitis following scarification . . .	7	11	4																
MIDDLE EAR.																			
Glucocatarrh of middle ear . . .																			
Chronic catarrh of middle ear . . .	2	5	3																
Inflammation of deep-seated tissues of middle ear . . .	2	1																	
INTERNAL EAR.																			
Nervous deafness not congenital . . .	1	23	10																
Nervous deafness congenital . . .		1	3	2															
Symptomatic deafness . . .																			
Total	29	61	30	17	52	17	50	25	39	36	35	29							

The condition of the ceruminous secretion is generally considered to be of great importance as a symptom in diseases of the ear. A glance at the above table will show that the cerumen of the ear was subject to greater or less changes in all these diseases. In 16 cases of the disease of the external ear, it was increased in quantity; in 14 out of the other 16 cases, it was either deficient or absent. In 40 out of 49 cases of disease of the membrana tympani, and in 14 out of 19 of the middle ear, it was likewise either absent or deficient. Out of 40 cases of nervous deafness, the cerumen was healthy in only 15; deficient in 24; and absent in 1. Some writers have stated that an absence or deficiency of cerumen is an indication of nervous deafness. The results which are exhibited above do not confirm this statement. They rather go to show that any deficiency of cerumen is more an indication that the auditory apparatus is in some way diseased, than a symptom of any particular affection.

The above table shows conclusively the impropriety of establishing a separate class of diseases, called otorrhœa. It will be seen, by a simple inspection of the table, that a discharge from the ear accompanied inflammation of the dermal, glandular, and cellular tissues of the meatus of the membrana tympani, and even of the middle ear. In fact, a running from the ear, as it is popularly termed, is a circumstance of frequent occurrence in diseases that are essentially different; as different as simple inflammation of the dermal tissue of the meatus, chronic inflammation of the membrane of the tym-

panum, and acute inflammation of the deep-seated tissues of the cavity of that membrane.

Fungoid growths, polypus, and the like, seem, like otorrhœa, to be associated with very different affections. It would be interesting to examine their different varieties, manner of growth, position in different parts of the meatus, and other circumstances; but the extent which this paper has already reached forbids such an investigation. It appears that 17 instances of such growths occurred in 140 cases of disease of the ear; and 15 out of the 17 instances accompanied affections of the external auditory meatus and of the *membrana tympani*.

One of the most frequent and unfortunate results of inflammation of the *membrana tympani* is perforation of that membrane. This occurred in 36 out of 49 cases, presented above. Three of them followed acute, and the remainder chronic myringitis. The same membrane was also perforated in the three instances which are given of inflammation of the cellular tissue of the middle ear, or, as it is sometimes called, internal otitis. The three instances of perforation with acute myringitis were healed, and the membrane restored to its normal condition. The same took place in two out of the three cases of inflammation of the middle ear. There are 33 cases presented of perforation occurring with chronic myringitis. In only two of these was the perforation healed; and in that form of myringitis following scarlatina no instance of restoration of the membrane occurred. In many of these instances, there can be no doubt that a neglect of proper treatment—an unwillingness on the part of the patient, or the patient's friends, to have the discharge interfered with—contributed very considerably to this unfortunate result. Opacity of the *membrana tympani* is another and a not unfrequent result of chronic myringitis. When it is produced by the deposition of lymph between the layers of the membrane, it is almost irremediable. The record shows 20 cases of this variety of inflammation not resulting from scarlatina. In 9 of these cases, that is, nearly in one-half of them, opacity occurred to a greater or less degree. In 26 cases of nervous deafness, the membrane of the tympanum preserved its normal appearance; in 14 cases, it is stated to have been more or less opaque. The opacity, however, in these cases had not the milky appearance, resembling the conjunctiva, which is seen in chronic myringitis, but was rather a dullness—an apparent want of vitality in the membrane, a dead look—than actual opacity.

Inflammation of the fauces and the neighbouring parts is a frequent complication of diseases of the ear. It appears above that 36 instances of this complication existed in 140 cases. In other words, we may infer that in more than one-fourth of the diseases of the ear, occurring in New England, some affection of the fauces or nasal passages probably exists. Indeed, the frequent occurrence of deafness with colds is a matter of ordinary observation. In 35 cases, the fauces were not only diseased, but the tonsils were enlarged.

A strumous diathesis has often been insisted upon by aurists, and especially by Schmalz, as a predisposing cause to disease of the ear. So far as it is proper to generalize from 140 cases, the statistics we have given go to confirm this notion. For it appears from the preceding table that, in 35 out of the 140 cases—that is, in 25 per cent. of them—there were enlarged cervical glands as well as enlarged tonsils. And it should be noticed that enlargement of the tonsils and glands of the neck occurred more frequently with affections of the middle ear and membrane tympani than with any other class.

We have now completed this analysis, so far as our limits will allow. We have omitted several points to which we should have been glad to direct attention, and dwelt, perhaps, too briefly upon others. It was our intention to add something upon the course of treatment which was pursued in the cases which have been presented; but we do not feel that it is proper, at the present time, to trespass farther upon the patience of our readers.

ART. III.—*Report of Twenty-five Cases of Urinary Calculus, in Twenty-three of which the Bi-lateral Operation was performed.* By PAUL F. EVE, M. D., Professor of Surgery in the Nashville University, Tennessee.

AMONG the committees appointed at the last meeting of the American Medical Association, was one to collect the statistics of the operation for the removal of stone in the bladder. In October, 1841, I first performed lithotomy; since then, a period of eleven and a half years, I have operated upon twenty-four cases of urinary calculus; nine of them within twelve months, four in Georgia and five in Tennessee. No one will doubt the importance of carefully prepared surgical statistics; and to make mine the more full and authentic, the valuable assistance of Prof. Means and Dr. Barry in the chemical analysis, and of Dr. Juriah Harris with the microscope, has been invoked in the examination of my collection of vesical stones, amounting to about one hundred and forty. In the analytical investigation, all proposed was simply the qualitative and not the quantitative composition of these foreign bodies.

The cases are now narrated in the order of their occurrence:—

CASE I.—A mulatto boy, eight years old, coming from Lincoln County, Georgia, has had symptoms of stone for some indefinite period. The bi-lateral operation was performed on him in October, 1841, after the method of Dupuytren, with the double lithotome caché. A mulberry calculus, weighing two drachms, was extracted. This is the handsomest specimen of the oxalate of lime formation in my collection. The mulberry-like granulations are small, distinct, and perfect. The wound healed so kindly that on the fourth day after the operation, the patient was considered well; in fact, was out of his room.